

REMARKS

Favorable reconsideration of the present application is respectfully requested.

Claim 23 has been amended, responsive to the rejection under 35 U.S.C. § 112, to change the change “perforated plate” to “perforated tray.” Concerning the objections in portion “b” of this rejection, it is noted that the values specified in Claims 23 and 27 are based upon original Claims 6 and 11.

The claimed invention is directed to a distillation apparatus which can minimize the plugging of the apparatus due to polymerization in a condensate. According to a feature of the invention set forth in the claims, a pressure control valve is connected to the exhaust gas conduit of a vacuum generator connected to the vapor phase connecting port of a reflux tank for the distillation column. A pressure controller is connected to the pressure control valve and includes a pressure detection line. For example, referring to the non-limiting embodiment of Figure 1, a pressure control valve 8 is connected to the condenser 5 at the exhaust gas side of the vacuum generator 4 and is controlled by the pressure controller 81 according to a pressure signal from the conduit 91 connecting the distillation column 1 with the reflux tank 3. In other embodiments (Figs. 2 and 3) the pressure controller detects the pressure in the vapor phase of the reflux tank 3 itself.

Accordingly, the pressure at the exhaust gas side of the vacuum generator may be controlled, which controls the pressure of the distillation column within a fixed range (page 27, lines 15-20). Additionally, plugging of the pressure control valve due to the polymerization of the polymerizable compound is prevented due to the flow of the exhaust gas through the pressure control valve (page 27, lines 20-25).

Claims 1, 2, 4, 21, 22 and 24 were newly rejected under 35 U.S.C. § 103 as being obvious over U.S. patent 6,878,239 (Matsumoto et al.) in view of U.S. patent 6,676,808, (Hamamoto et al.) and U.S. patent 5,143,585 (Ichikawa et al.). According to the Office

Action, Matsumoto discloses “substantially the features of the apparatus as claimed,” except for the reflux tank which is taught by Hamamoto and a vacuum generator, pressure controller, pressure control valve and pressure detection line which are taught by Ichikawa et al. However, as is evident from the extent of the missing elements set forth in the rejection, Matsumoto is devoid of a description of the novel features of the claimed invention.

According to Matsumoto, clogging of a purifying system by a polymerizable material is inhibited by adding a polymerization inhibitor to liquid contact chambers of the system. For example, in the embodiment of Figure 3 (Figs. 1 and 2 of Matsumoto are prior art), a gas outlet of a distillation column 1 is connected to an ejector seal tank 6 via gas and liquid contact chambers 3 and 4, in combination with vacuum generators E1 and E2. A pump 21 supplies a polymerization inhibitor from the ejector seal tank 6 to the gas inlet with contact chambers 3 and 3 (col. 3, lines 28-34 and lines 54-57).

As the Examiner has recognized, Matsumoto et al. lacks a reflux tank, a pressure control valve connected to the exhaust gas conduit of the vacuum generators E1 or E2, or a pressure controller connected to the pressure control valve, the pressure controller having a pressure detection line. As the Examiner has noted, Matsumoto discloses a pressure gauge 7 and valve 8, but the valve 8 is used to control the delivery of outside air into the line connecting the condenser 2 with the vacuum generator E1. There is no suggestion for a pressure control valve connected to an exhaust gas conduit of the vacuum generator E1. Thus, the similarities between Matsumoto et al. and the claimed invention are limited to the presence of a distillation column, a condenser, a vacuum generator and a controlled valve. A reflux tank, a condenser connected to a reflux tank, a vacuum generator connected to a reflux tank, and a pressure control valve connected to the exhaust gas conduit of the vacuum generator are all missing from Matsumoto.

Hamamoto et al. was cited to suggest the use of a reflux tank in conjunction with a distillation column but provides no teaching for the claimed manner of integration of the reflux tank with a condenser and vacuum generator. In any case, Hamamoto et al. also fails to teach the claimed pressure control valve and pressure controller.

Ichikawa et al. discloses a vacuum pump 5 in the exhaust pipe 15 of an emulsifying tank 1. However, the organic solvent sucked from the emulsifying tank through the pipe 15 is simply exhausted to the outside (col. 4, lines 19-23). Ichikawa does not teach a pressure control valve connected to the exhaust gas conduit of the vacuum pump, and would not suggest modifying the air valve 8 of Matsumoto et al. such that it comprises a pressure control valve connected to the exhaust gas conduit of the vacuum generator E1. The claims thus define over any combination of the above references.

Claim 3 further recites a perforated tray disposed in the distillation column. U.S. patent 6,755,943 (Mizutani et al.) was cited to suggest the use of a perforated tray in Matsumoto. However, regardless of what teaching Mizutani et al. may have in this respect, it provides no teaching for modifying Matsumoto to provide the reflux tank, vacuum generator, pressure control valve and pressure controller recited in Claim 1, and so the claims define over any combination of the above references.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early notice of allowability.

Respectfully submitted,

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